

# December 2008 Climate Summary for Southwest Lower Michigan

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## Overview

The month of December 2008 was characterized by unseasonably cold temperatures, well above normal precipitation and well above normal snowfall relative to the 1971-2000 computed normal values (Table 1). It was the coldest December across Southwest Lower Michigan since December of 2000. Below normal temperatures prevailed across the area for most of the month (Fig 1-3). There were two periods of above normal temperatures in December, from the 14<sup>th</sup> to 15<sup>th</sup> and from the 26<sup>th</sup> through 30<sup>th</sup>. There were only 5 days with above freezing temperatures in the first three weeks of the month.

Average temperatures ranged from 1.4 degrees below normal at the stations listed in Table 1 to greater than five degrees below normal north and west of Freemont (Fig. 4). Because most stations in Southwest Lower Michigan were significantly colder than normal compared to the stations in Table 1, there is a difference between the values shown in Table 1 and in Figure 4.

Precipitation occurred on nearly every day of the month across the area. Precipitation was nearly twice as much west of US-131 than east of US-131. Grand Haven reported 8.26 inches of precipitation for the highest reported amount in Southwest Michigan. Departures from the normal precipitation ranged from around two inches above normal in the southeast sections to over four inches above normal in the northwest lake shore areas (Fig. 8b).

Snowfall was also heaviest west of US-131 (Fig. 9a). Snow amounts were as high as 88.7 inches in Hart to as low as 23.5 inches in Brooklyn. Most areas west of US-131 had received more than four feet of snow, most areas east of US-131 had between two and four feet of snow. These snowfall amounts were above normal across the area. Figure 9a shows areas near and west of US-131 ranged from three to four feet above normal in snowfall, while areas east had between snowfalls of between one and two feet above normal.

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TABLE 1. Reported temperature, precipitation and snowfall amounts for December 2008 at selected climate stations in Southwest Lower Michigan. Normals are computed from 30-year averages from 1971-2000.

<b>Location</b>		<b>Temperature (degrees F)</b>	<b>Precipitation (inches)</b>	<b>Snowfall (inches)</b>
<b>Grand Rapids</b>	<i>Reported</i>	26.2	6.27	54.6
	<i>Normal</i>	27.6	2.70	18.8
	<i>Departure</i>	-1.4	+3.57	+35.8
<b>Lansing</b>	<i>Reported</i>	25.5	3.80	29.0
	<i>Normal</i>	26.9	2.17	13.2
	<i>Departure</i>	-1.4	+1.63	+15.8
<b>Muskegon</b>	<i>Reported</i>	27.2	6.99	68.6
	<i>Normal</i>	28.6	2.64	29.3
	<i>Departure</i>	-1.4	+4.35	+ 39.3

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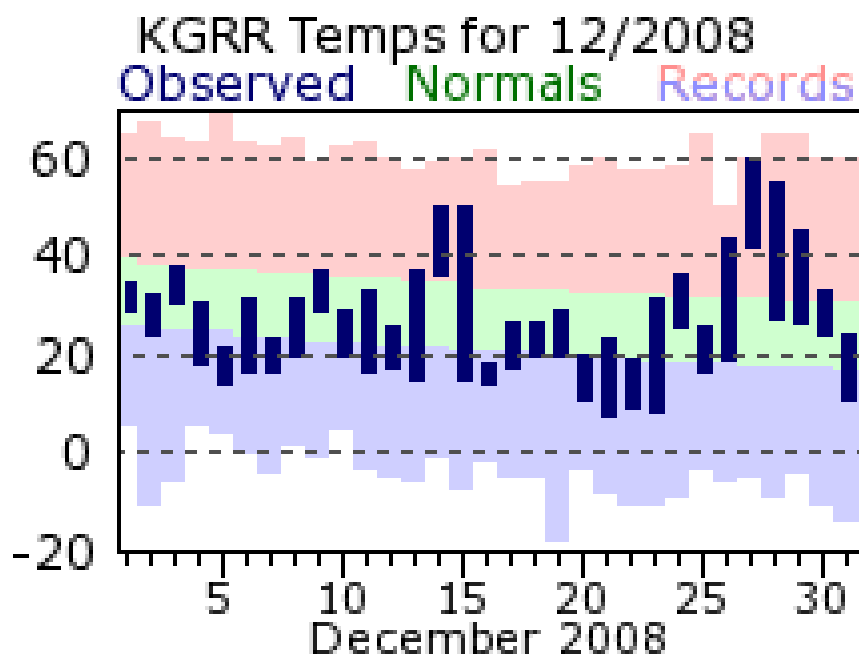


FIG. 1. Observed temperatures at the Grand Rapids International Airport. Dark blue bars are the temperature range for each day. The green strip indicates the normal range of temperatures. Record high and low temperatures are indicated at the top of the pink area and the bottom of the blue area, respectively. Normals computed as in Table 1.

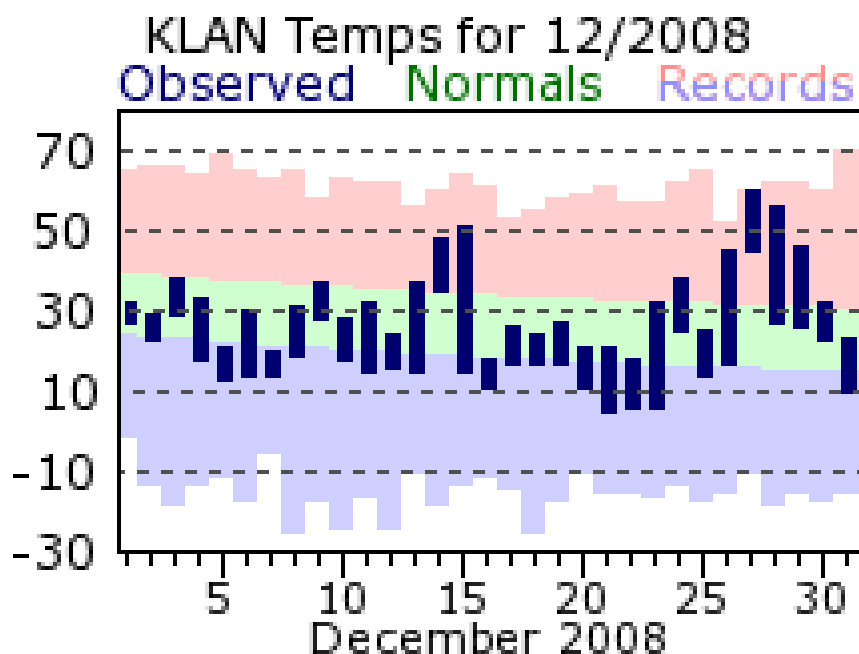


FIG. 2. As in Fig. 1 except for the Lansing airport.

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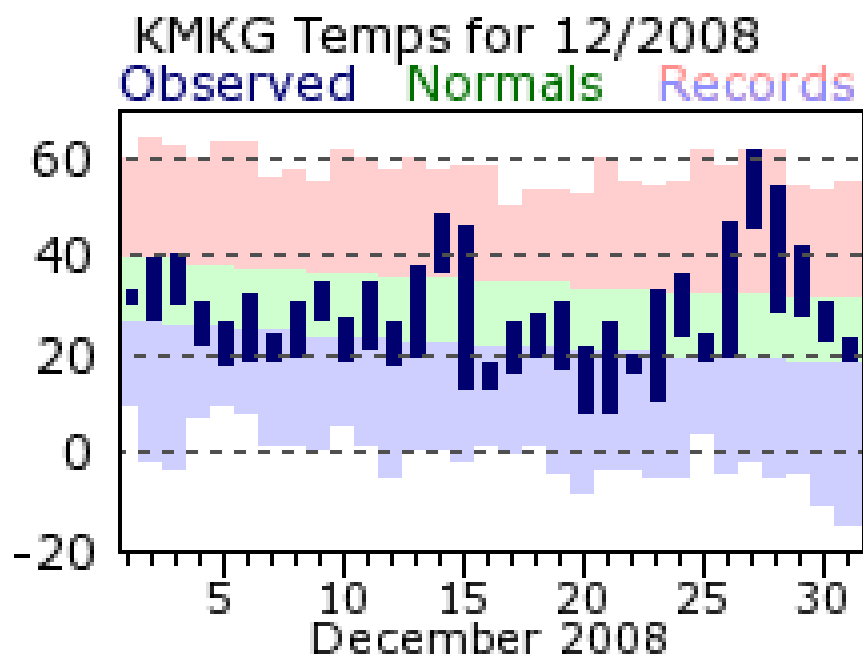
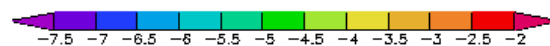
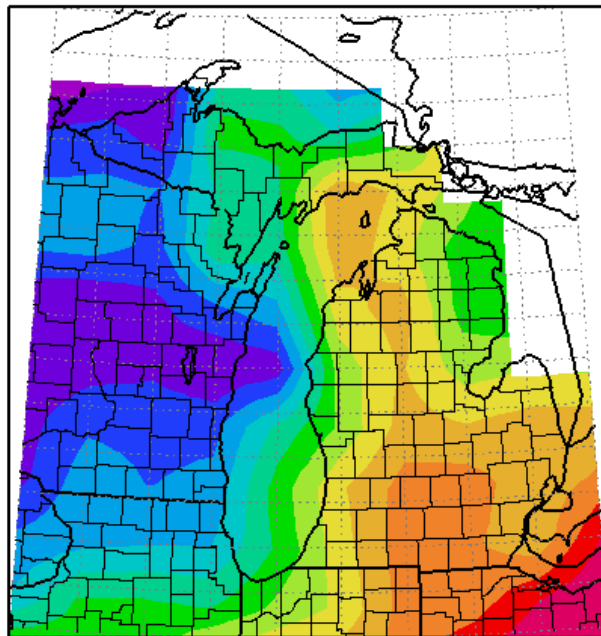


FIG. 3. As in Fig. 1 except for the Muskegon airport.

Average Temperature Departure from Mean in Degrees F  
December 1, 2008 to December 31, 2008



NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

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FIG. 4. Average temperature departure (degrees F) for December of 2008.

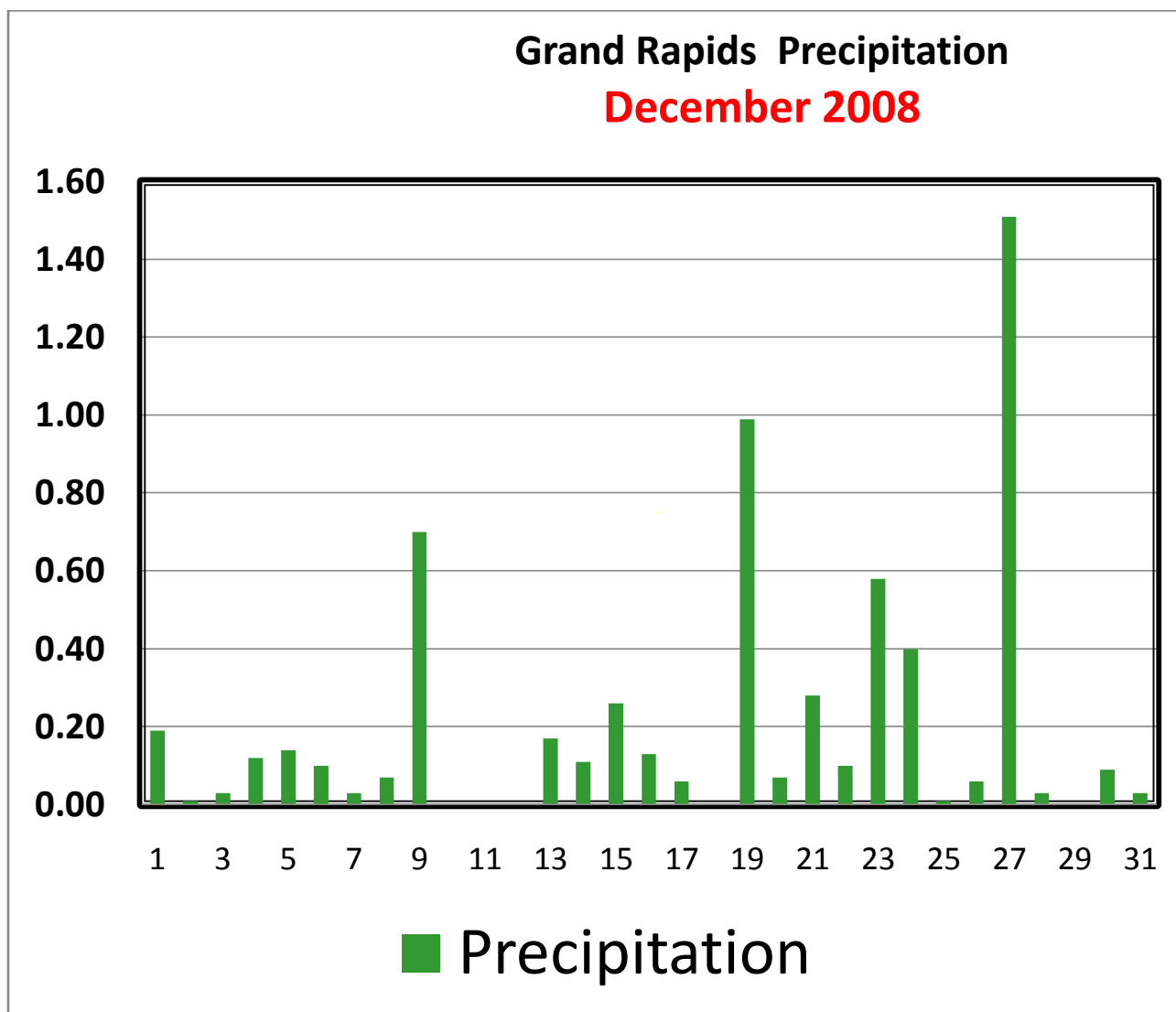


FIG. 5. Daily precipitation for December of 2008 at the Grand Rapids International Airport.

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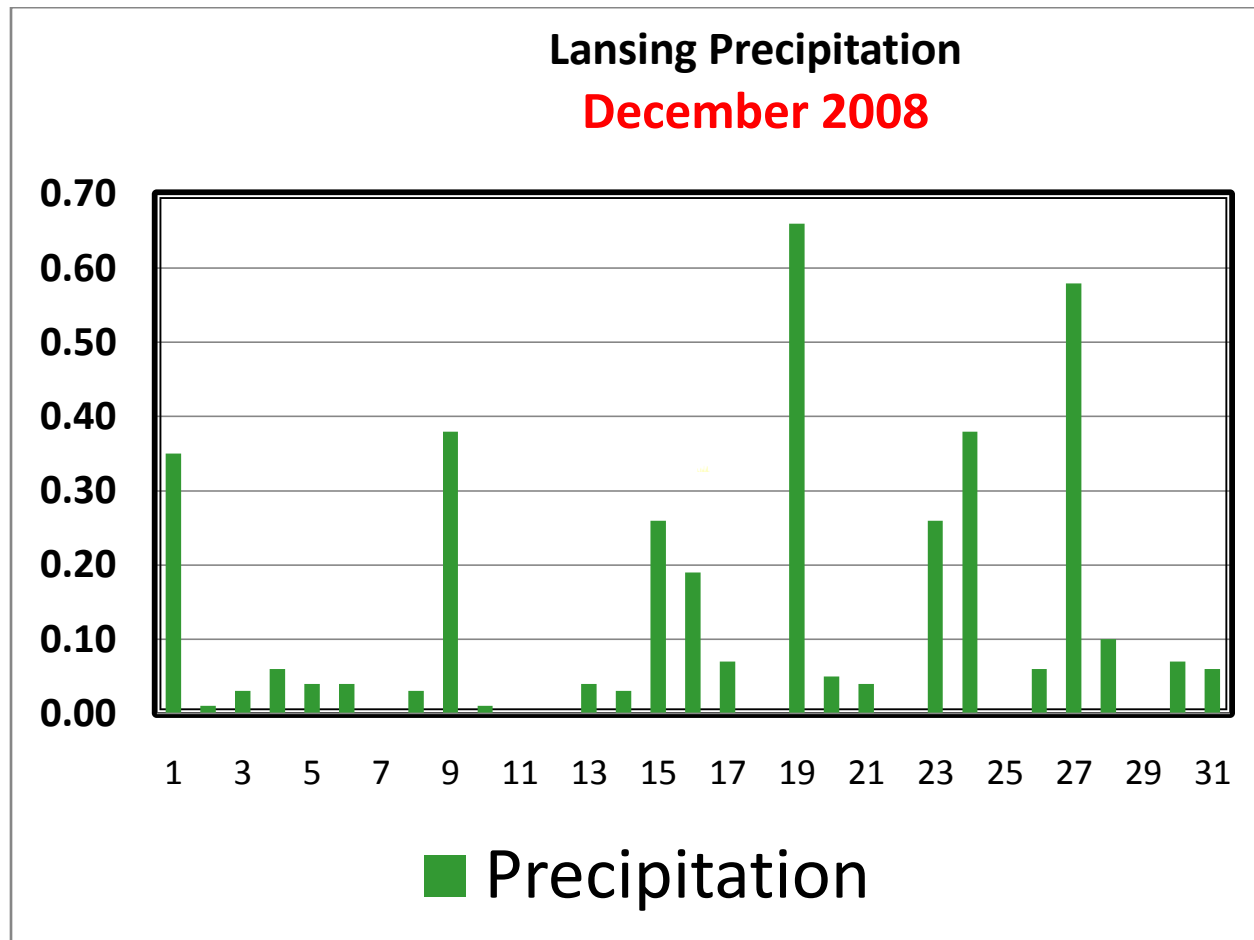


FIG.6. As in Fig. 5 except for the Lansing Capital City Airport.

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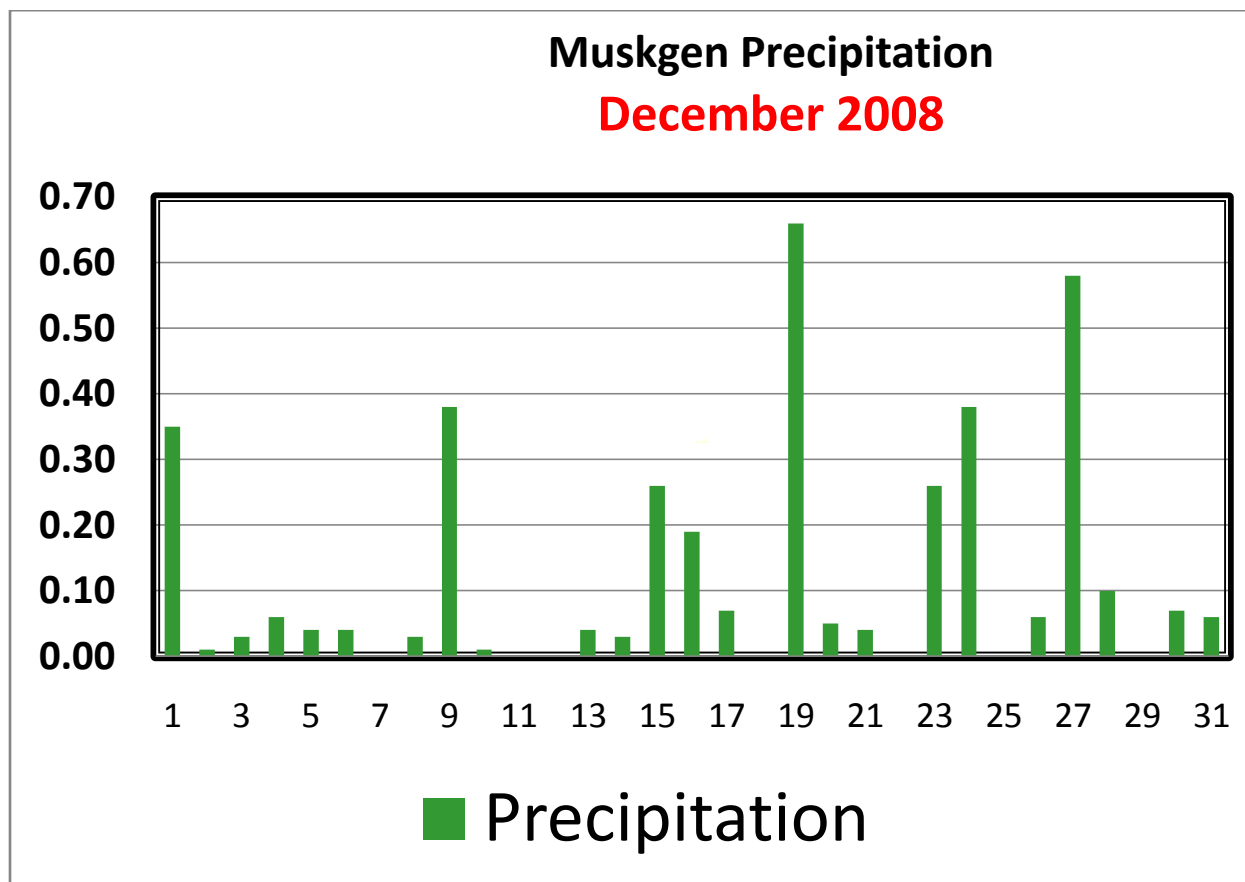
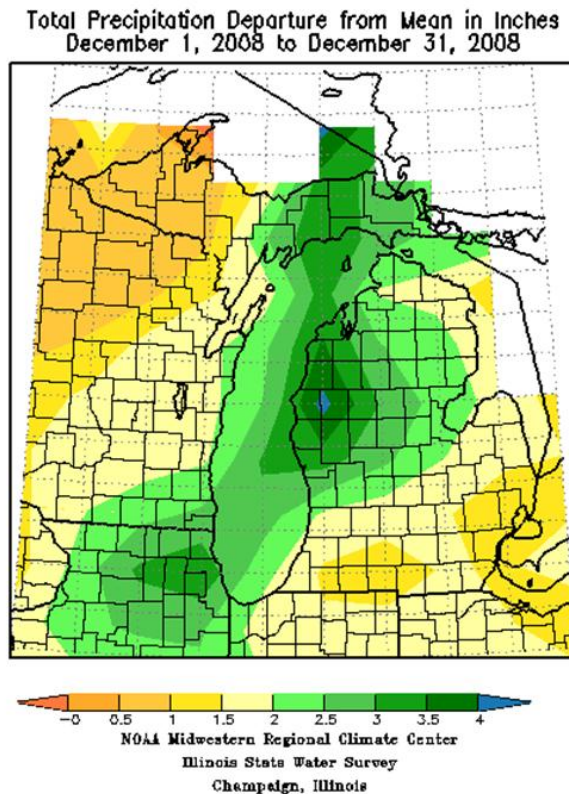
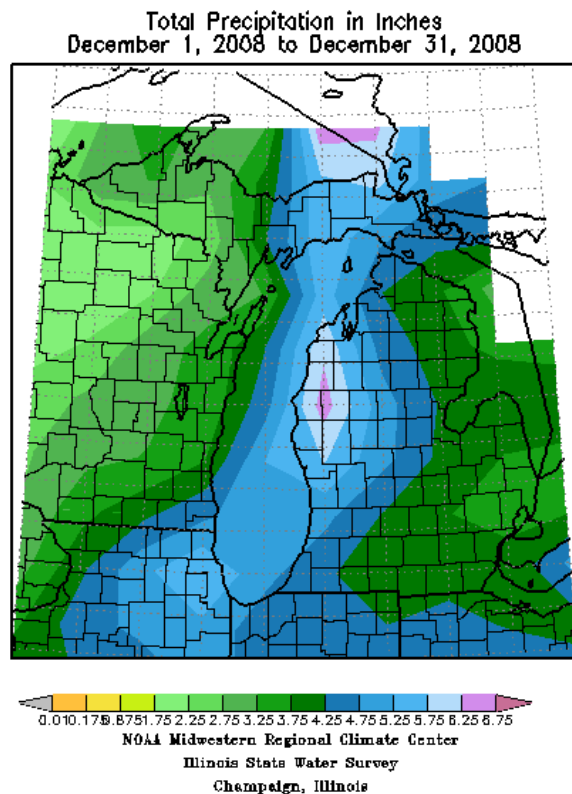


FIG. 7. As in Fig. 5 except for the Muskegon County Airport.

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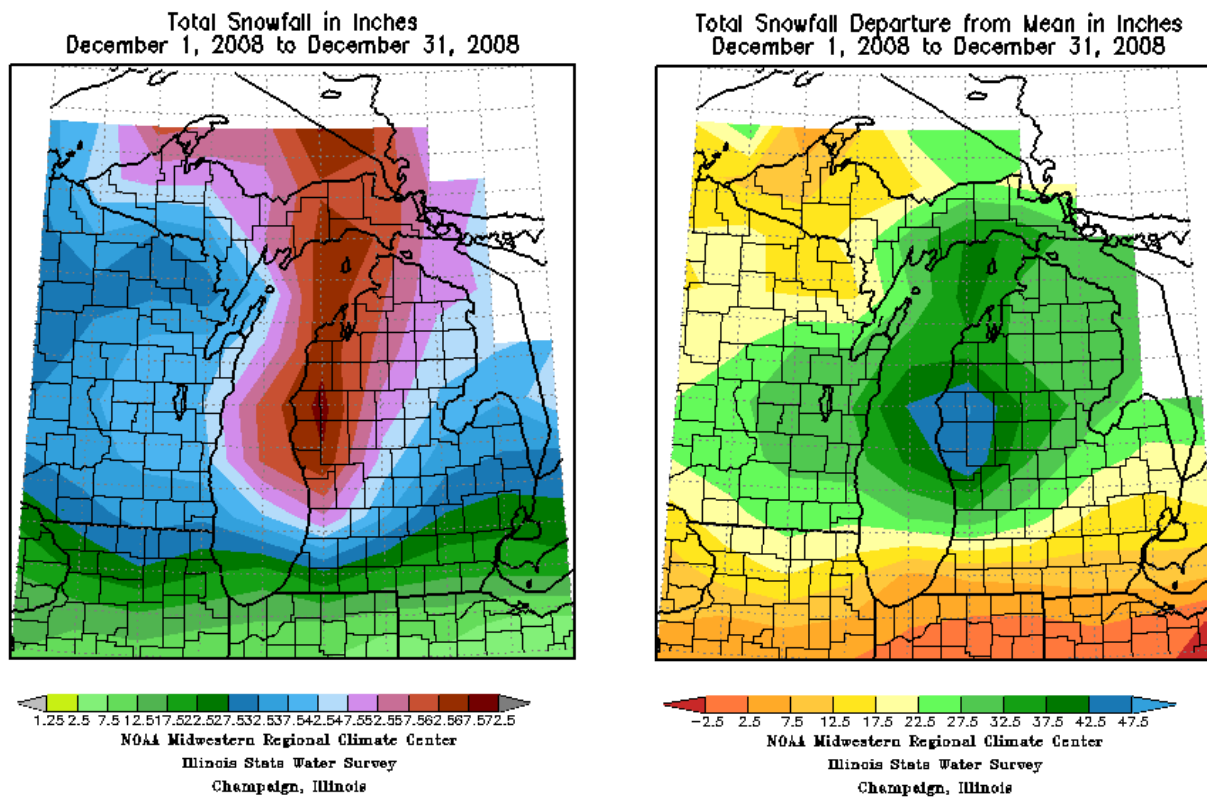
(a) Inches of Total Precipitation

(b) Total Precipitation Departure from Mean

FIG. 8. (a) Total precipitation for December 2008, and (b) Total precipitation departure from the mean.



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(a) Snowfall

(b) Snowfall departure from mean

FIG.9. (a) Snowfall for December 2008, and (b) departure from the mean.

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## Highlights of the month

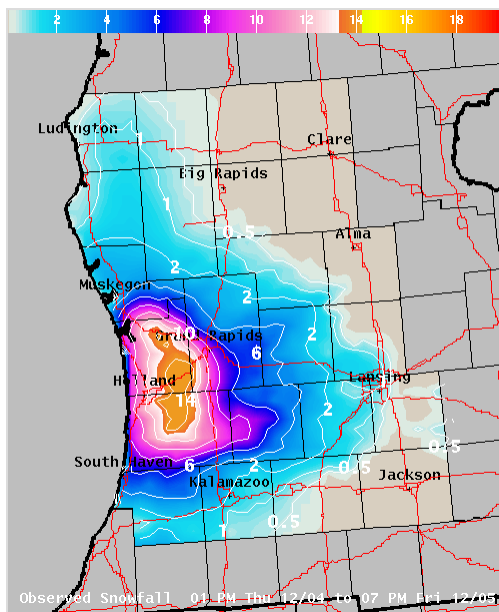


FIG. 10. Storm total snowfall from December 4<sup>th</sup> to 5<sup>th</sup>.

### 4<sup>rd</sup> – 5<sup>th</sup>

The first push of cold air of the month resulted in the first heavy snowfall event of the month (Fig. 10). Over 14 inches of snow fell in some locations west of Grand Rapids, near the Lake Michigan shore during this time.

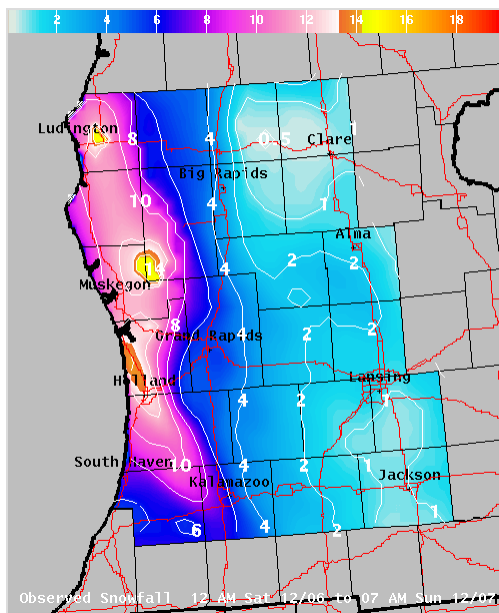


FIG. 11. Storm total snowfall for December 7<sup>th</sup> from midnight through 7 AM<sup>t</sup>.

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**7<sup>th</sup>**

The second push of cold air behind an Alberta Clipper that crossed the state late on the 6<sup>th</sup> produced yet another lake snow event during the morning of the 7<sup>th</sup> (Fig. 11) as the cold air poured in behind that system. This event also brought over a foot to lake shore areas west of Grand Rapids.

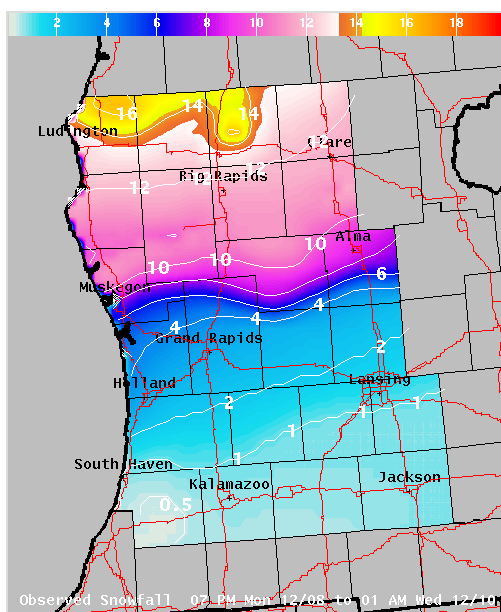


FIG. 12. Storm total snowfall from December 8<sup>th</sup> at 7 PM to the 10<sup>th</sup> at 1 AM.

**8<sup>th</sup> – 10<sup>th</sup>**

A storm system whose center passed east along I-94 on the 9<sup>th</sup> brought over a foot of snow near Route 10, and less than two inches south of I-96 (Fig. 12). Between Route 10 and I-96, six to ten inches of snow was common.

**14<sup>th</sup> – 15<sup>th</sup>**

A storm system crossing east over southern Canada brought a brief warm-up. High temperatures were in the 40s during this time. Many locations near and south of I-94 lost their snow cover.

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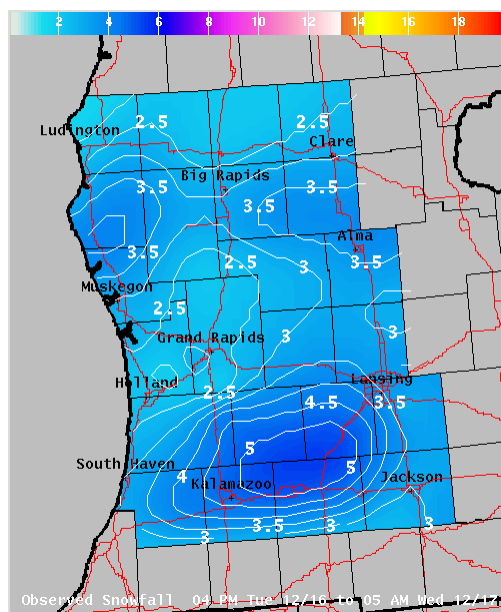


FIG. 13. Storm total snowfall from December 16<sup>th</sup> at 4 PM to December 17<sup>th</sup> at 5 AM.

**16<sup>th</sup> – 17<sup>th</sup>**

A strong cold front passed through the area and produced lake effect snow that was brought well inland by strong winds. Snowfalls of two to five inches were common across the area (Fig. 13). The heaviest snowfall was just north of Kalamazoo.

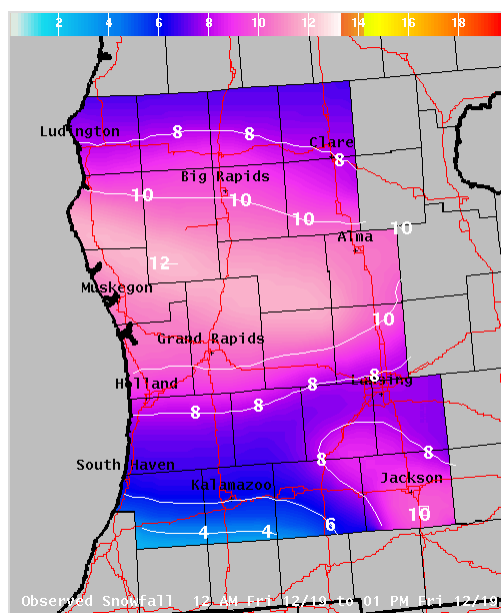


FIG. 14. Storm total snowfall from December 19<sup>th</sup> at midnight through 1 PM.

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### 19<sup>th</sup>

A strong storm system passed across Ohio during the 19<sup>th</sup> and brought heavy snow to most of Southwest Lower Michigan during the morning of the 19<sup>th</sup>. Over six inches of snow fell across most of the area (Fig. 14). Some locations near I-96 had around a foot of snow from this event. This storm brought in the most persistent cold air of the month.

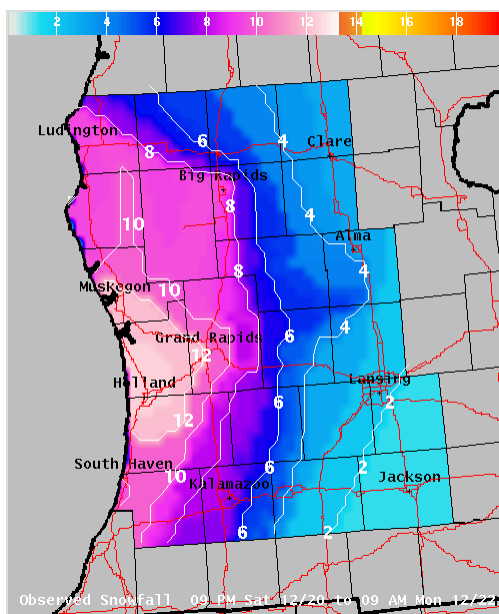


FIG. 15. Snowstorm December 20<sup>th</sup> at 9 PM to December 22<sup>nd</sup> at 9 AM.

### 20<sup>th</sup>-22<sup>th</sup>

A very deep storm system stalled over northern Lake Huron and brought strong winds and heavy snow to areas near and west of US-131 (Fig. 15). Eight to twelve inches fell as the cold air surged in behind the storm. Temperatures mostly ranged from the single digits to teens. Areas even well away from Lake Michigan received at least two inches of snow.

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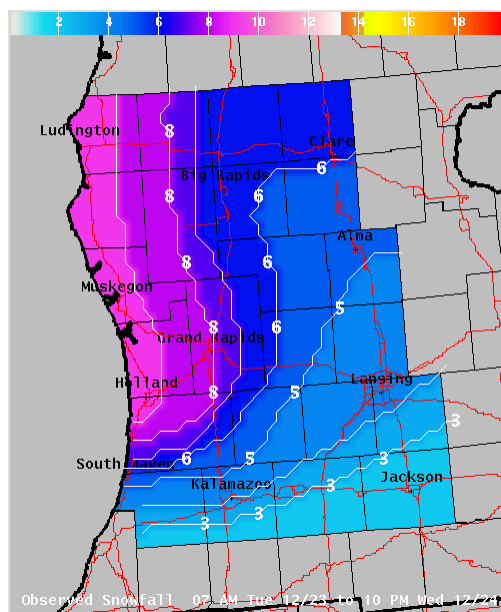


FIG. 16. Snowstorm from December 23rd at 7 AM through the 24th at 10 PM.

### 23th-24<sup>th</sup>

Lake effect snows continued from the 23<sup>rd</sup> into the 24<sup>th</sup> as cold air continued to pour into Southwest Michigan. Winds were not as strong during this time, keeping heavier snow closer to the lake shore. Even so, eight to ten inches fell west of US-131 north of South Haven (Fig. 16).

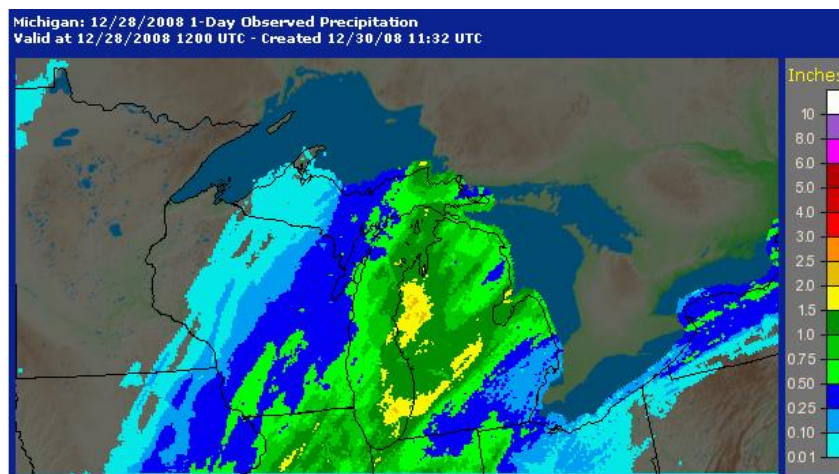


FIG. 17. Total precipitation from 7 AM on the 27th through 7 AM on the 28th.

### 26th-28th

A storm from the southwest United States that tracked west of Lake Superior on the morning of the 27<sup>th</sup>, brought the warmest weather of the month to the area. High temperatures reached the lower 60s in some locations on the 27<sup>th</sup>. Heavy rainfall fell from the 27<sup>th</sup> into the 28<sup>th</sup> (Fig. 17), both from the push of warm air early on the 27<sup>th</sup>, and from the cold front later that same day. That, combined with the warm temperatures, melted most of the snowpack near and south of I-96. This resulted in numerous urban and small stream flood

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issues, as well as ice jams and related problems. At least seventeen counties had some roads washed out. Ottawa County was particularly hard-hit, with about 3 million dollars worth of damage.

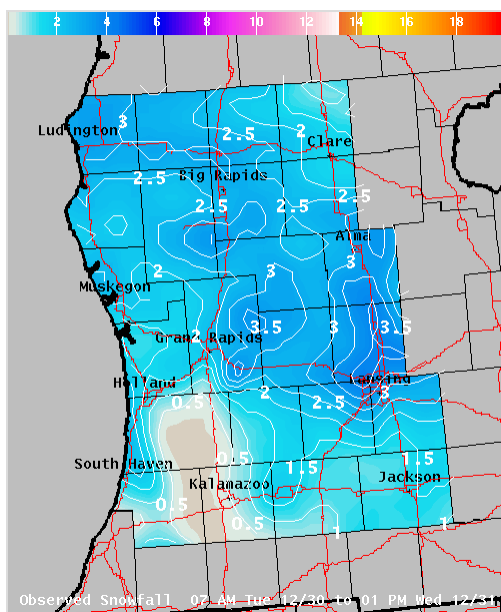


FIG. 18. The final snowstorm for 2008, from December 30th at 7 AM to the 31st at 1 PM.

### 30<sup>th</sup> – 31<sup>th</sup>

A storm developed on the cold front that had come through on the 28<sup>th</sup>, and brought two to four inches of additional snow to the area (Fig. 18). Temperature fell into the teens during the day on the 31<sup>st</sup> as the cold air surged back in behind the storm.